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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/396,266	09/15/1999	THOMAS H. PETERSON	1998U007A.US	7188

7590 11/21/2001
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EXAMINER

LU, C CAIXIA

ART UNIT PAPER NUMBER

1713

DATE MAILED: 11/21/2001

12

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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Paper No. 12

Application Number: 09/396,266
Filing Date: 09/15/99
Appellant(s): Peterson

MAILED

NOV 15 2001

Lisa Kimes Jones
For Appellant

GROUP 1700

EXAMINER'S ANSWER

MAILED

NOV 15 2001

GROUP 1700

This is in response to appellant's brief on appeal filed on October 12, 2001.

(1) *Real Party in Interest*

A statement identifying the real party in interest is contained in the brief.

(2) *Related Appeals and Interferences*

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The brief does not contain a statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief. Therefore, it is presumed that there are none. The Board, however, may exercise its discretion to require an explicit statement as to the existence of any related appeals and interferences.

(3) *Status of Claims*

The statement of the status of the claims contained in the brief is correct.

(4) *Status of Amendments After Final*

No amendment after final has been filed.

(5) *Summary of Invention*

The summary of invention contained in the brief is correct.

(6) *Issues*

The appellant's statement of the issues in the brief is correct.

(7) *Grouping of Claims*

The rejection of claims 1-3, 5-20, and 22-32 stand or fall together because appellant's brief does not include a statement that this grouping of claims does not stand or fall together and reasons in support thereof. See 37 CFR 1.192(c)(7).

(8) *Claims Appealed*

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) *Prior Art of Record*

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The following is a listing of the prior art of record relied upon in the rejection of claims under appeal.

5,066,741	Campbell, Jr.	Nov. 19, 1991
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5,807,801	Tsutsui et al.	Sep. 15, 1998
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(10) *Grounds of Rejection*

The following ground(s) of rejection are applicable to the appealed claims:

1. Claims 1-3, 5-20, and 22-32 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1, 12, 13, 18, 29 and 30

According to the specification, J seems to define a divalent group and Y a monovalent group; however, when as a Group 15 atom, J would be trivalent and have one extra bond after bonding with Y, when as a group 17 atom, J would be monovalent and not have any free bond to bond with Y. In both cases, the catalyst precursor formula would be incorrect.

Claims 9 and 26

According to the specification, Y seems to be a monovalent group; however, when Y is defined as Groups 13-16 heteroatom, Y would have extra bond(s) after bonding with J, thus, the catalyst precursor formula would be incorrect.

Claims 5 and 22

The terms "indene" and "fluorene" lack antecedent basis.

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2. Claims 1-3, 5-20, and 22-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsutsui et al. (US 5,700,750).

Tsutsui et al. teach an olefin polymerization process in the presence of a catalyst system comprising a metallocene compound represented by formula $R^1_h R^2_l R^3_m R^4_n M$ and an activator of aluminoxane, wherein M represents Zr, Hf or Ti; R^1 represents a cycloalkadienyl group such as substituted or unsubstituted cyclopentadienyl and indenyl groups, R^2 is selected from OR, SR, NR_2 or PR_2 with R being a hydrocarbyl, and R^3 and R^4 represent a cycloalkadienyl group, an aryl group, an alkyl, a halide, or hydrogen (col. 4, line 20 to col. 5, line 14).

Although Tsutsui et al. does not exemplify a metallocene containing only one cyclopentadienyl ligand, when R^1 is a cycloalkadienyl group rather than a cyclopentadienyl, and R^3 and R^4 are not cycloalkadienyl containing ligands, Tsutsui's metallocene compound, $R^1_h R^2_l R^3_m R^4_n M$, encompasses the metallocene compound, $C_p D^a(JY)(Q)_{(a-2)}$, of the instant claims.

Thus, it would have been obvious to a skilled artisan at the time the invention to employ the process of Tsutsui et al. to prepare a polyolefin in the presence of a catalyst system comprising a monocycloalkadienyl containing metallocene compound represented by formula $R^1_h R^2_l R^3_m R^4_n M$ and an activator of aluminoxane since such is within the scope of Tsutsui et al.'s teaching and is expected to work with lowered cost (the monocyclopentadienyl metallocene compound are likely cheaper to produce compared to the dicyclopentadienyl metallocene) and in the absence of showing of criticality and unexpected results.

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3. Claims 1-3, 5-20, and 22-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Campbell, Jr. (US 5,206,197).

Campbell teaches a catalyst system comprising a monocyclopentadienyl containing metallocene and a second component (the activator) such as tetraphenyl borate containing compound for polymerization of vinyl aromatic monomers with a high degree of syndiotacticity (col. 1, line 48 to col. 2, line 15; col. 2, lines 38-40; col. 4, lines 4-13; and col. 6, lines 45-68;). The exemplified metallocene compounds, (pentamethylcyclopentadienyl)-diisopropoxyhafnium chloride (col. 4, lines 4-5) and (n-butylcyclopentadienyl)dimethyl(n-butoxy)titanium (col. 4, lines 12-13) read on at least the instant Claim 1.

However, Campbell's teaching differs from that of the instant claims in that Campbell's catalyst system is for the polymerization of vinyl aromatic monomers rather than olefins of the instant claims.

Although Campbell, Jr. do not teach polymerization of α -olefins with their catalyst system, a skilled artisan would have expected that Campbell, Jr.'s catalyst system can be used for the α -olefin polymerization to provide a polyolefin with syndiotacticity and improved activity because (i) α -olefins and vinyl aromatic monomers contain the same vinyl functional group and should be polymerized by the same mechanism, and (ii) α -olefin are known to be more reactive than vinylaromatic monomer toward metallocene catalysts in polymerization.

Thus, it would have been obvious to a skilled artisan at the time the invention to employ the catalyst system of Campbell, Jr. to polymerize α -olefins in search of a more efficient catalyst

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and to provide polyolefins with desired structure regularities and improved activity and in the absence of showing of criticality and unexpected results.

(11) Response to Argument

(i) Response to the argument that the examiner has not provided the necessary motivation in Tsutsui's teaching to go from the bis(cyclopentadienyl) to the mono(cyclopentadienyl) catalyst with enhanced activity.

The examiner does not dispute that the preferred metallocene compounds of Tsutsui et al. are bis(cyclopentadienyl) compound, but Tsutsui et al. do not teach only bis(cyclopentadienyl) compound. As pointed out supra and in the previous office action, Paper no. 5, Tsutsui et al. do generically teach the mono(cyclopentadienyl) compound, therefore, it would have been obvious to a skilled artisan to arrive at the instant invention by use a mono(cyclopentadienyl) compound containing catalyst and expected it to work. Tsutsui et al. also expressively indicate that their catalyst has "good stability against air or moisture and high polymerization activity." Appellants need to show the criticality and unexpected result between Tsutsui's bis(cyclopentadienyl) compound containing catalyst system and applicants' mono(cyclopentadienyl) compound containing catalyst system in order to overcome the rejections.

(ii) Response to the argument about rejection over Campbell.

Contrary to the assertion that the claimed metallocene compound do not read on any compound recited in Campbell, as indicated supra, the exemplified metallocene compounds of Campbell, (pentamethylcyclopentadienyl)-diisopropoxyhafnium chloride (col. 4, lines 4-5) and (n-

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butylcyclopentadienyl)dimethyl(n-butoxy)titanium (col. 4, lines 12-13) read on at least the instant Claim 1.

Contrary to the assertion that styrene and alpha-olefin are polymerized by completely different mechanisms, it is well establish in the art of polymerization by metallocene catalyst that they both are polymerized by coordination-insertion of the alkenyl group. It is also well known in the art that the styrene is not as reactive toward a metallocene catalyst as olefin due to the electronic and steric effect of the phenyl group in the styrene. Therefore, a catalyst is reactive toward styrene polymerization is expected more reactive towards olefin polymerization, however, a catalyst is reactive toward olefin polymerization may not reactive enough towards styrene polymerization. Thus, a skilled artisan will be motivated to use Campbell's monocyclopentadienyl compound containing catalyst system in search for a more reactive catalyst system towards olefins.

Because the rejection is based on polymerization using metallocene catalyst, the argument over a polymerization using anionic catalyst such as butyllithium is irrelevant in this case.

(iii) Response over the comparative results.

Appellant's comparative results has been considered, however, they fail for provide criticality and unexpected results because:

--Appellants need to show the criticality and unexpected result between Tsutsui's bis(cyclopentadienyl) metallocene containing catalyst system and appellants' mono(cyclopentadienyl) metallocene containing catalyst system.

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--Appellants need to show the criticality and unexpected result between Campbell's styrene polymerization process and applicants' olefin polymerization process.

--The showing of unexpected results is not commensurate with the scope of the instant claims.

The experiments showing unexpected results are not sufficiently comprehensive to permit the extrapolation to all of the embodiments falling within the scope of the instant claims considering the unpredictable nature of catalyst activities.

For the above reasons, it is believed that the rejections should be sustained.


Respectfully submitted,

CL
November 9, 2001

Appeal Conference

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